ABSTRACT

Glass/nanoparticle composites are provided which include a glass matrix with a high density of heterologous nanoparticles embedded therein adjacent the outer surfaces of the composite. Preferably, the glass matrix is formed of porous glass and the nanoparticles are yttrium-iron nanocrystals which exhibit the property of altering the polarization of incident electromagnetic radiation; the composites are thus suitable for use in electrooptical recording media. In practice, a glass matrix having suitable porosity is contacted with a colloidal dispersion containing amorphous yttrium-iron nanoparticles in order to embed the nanoparticles within the surface pores of the matrix. The treated glass matrix is then heated under time-temperature conditions to convert the amorphous nanoparticles into a crystalline state while also fusing the glass matrix pores. Nanoparticle loadings on the order of 10^9 nanoparticles/mm^2 of glass surface area are possible, allowing construction of recording media having a recordable data density many times greater than conventional media.